WHAT IS CLAIMED IS:

1. A thin film capacitor comprising:

(a) a substrate,

(b) a first polymeric film comprising an electrically conductive polymer located on the substrate,

(c) a pentoxide layer selected from the group consisting of tantalum pentoxide, or niobium pentoxide, and mixtures thereof, and located on a surface of the first polymeric film,

(d) a second polymeric film comprising an electrically conductive polymer located on a surface of the pentoxide layer.

2. The thin film capactior of Claim 1, wherein the substrate is selected from the group consisting of vinyl polymers, olefin polymers, polyesters, and mixtures thereof.

3. The thin film capacitor of Claim 1, wherein the first polymeric film and the second polymeric film is selected from the group consisting of polyanilin polymers, ligno-sulfonic acid polymers, poly pyrrol polymers, thiophene-based polymers, and mixtures thereof.

4. The thin film capacitor of Claim 1, wherein the first polymeric film has a thickness ranging from about 100 nanometers to about 10 micrometers.

5. The thin film capacitor of Claim 1, wherein the pentoxide layer has a thickness ranging from about 10 to about 100 nanometers.

6. The thin film capacitor wherein the substrate has a thickness that is at least about 0.01 mm.

7. The thin film capacitor of Claim 1, wherein the first polymeric film or the second polymeric film is selected from the group consisting of polythiophene-based polymers, polyaniline-based polymers, polypyrrole-based polymers, polyethyleneoxide-based polymers, and mixtures or copolymers thereof.

8. A thin film capacitor comprising: (a) a substrate, (b) a first polymeric conductive layer located on a surface of the substrate and (c) a plurality of alternating pentoxide layer/polymeric conductive layers

extending from the first polymeric layer, wherein the total number of pentoxide layers is n and the total number of polymeric conductive layers is n+1.

9. The thin film capacitor of Claim 8, wherein n ranges from 1 to 30.

10. The thin film capacitor of Claim 8, wherein the capacitor has a series connection.

11. The thin film capacitor of Claim 8, wherein the capacitor has a parallel connection.

12. The thin film capacitor of Claim 8, wherein the substrate is a non-conductive substrate selected from the group consisting of vinyl polymers, olefin polymers, polyester polymers and mixtures thereof.

13. The thin film capacitor of Claim 8, wherein the substrate is selected from the group consisting of vinyl polymers, olefin polymers, polyesters, and mixtures thereof.

14. The thin film capacitor of Claim 8, wherein at least one polymeric film is selected from the group consisting of polyaniline-based polymers, polypyrrole-based polymers, polyethyleneoxide-based polymers, polythiophene-based polymers, and mixtures or copolymers thereof.

15. A method for making a thin film capacitor comprising:

(a) applying a first electrically conductive polymer located on a substrate,

(b) applying a pentoxide layer, tantalum pentoxide, or niobium pentoxide, or mixtures thereof to the polymeric conductive layer, and

(c) applying a second electrically conductive polymer located on the pentoxide layer, and thereby forming a thin film capacitor.

16. The method of Claim 15, wherein the thin film capacitor formed comprises:

(a) a substrate,

(b) a first polymeric film comprising an electrically conductive polymer located on the substrate,

(c) a pentoxide layer selected from the group consisting of tantalum pentoxide, or niobium pentoxide, and mixtures thereof, located on a surface of the first polymeric film,

(d) a second polymeric film comprising an electrically conductive polymer located on a surface of the pentoxide layer.

17. The method of Claim 15, wherein the thin film capacitor comprises (a) a substrate, (b) a first polymeric conductive layer located on a surface of the substrate and (c) a plurality of alternating pentoxide layer/polymeric electrically conductive layers extending from the first polymeric layer, wherein the total number of pentoxide layers is n and the total number of polymeric conductive layers is n+1.

18. The method of Claim 15, wherein the wherein the first polymeric film and the second polymeric film is selected from the group consisting of polyaniline-based polymers, polypyrrole-based polymers, polyethyleneoxide-based polymers, polythiophene-based polymers, and mixtures or copolymers thereof.